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09/863,059	05/22/2001	Hisanori Kawakami	9319S-000205	7384

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EXAMINER	
QI, ZHI QIANG	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 02/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/863,059	KAWAKAMI ET AL.	
	Examiner	Art Unit	
	Mike Qi	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-98415 (Mitsuru) in view of US 6,025,644 (Imaeda).

Claim 1, Mitsuru discloses (col.1, line 45 – col.3, line 47; Figs.1-6) a structure of liquid crystal display device comprising:

- a liquid crystal panel (10) (generally, the liquid crystal panel has a pair of substrates that holds the liquid crystal);
- a light guide (7) provided opposite to one of the substrates;
- a flexible wiring board (9) (flexible substrate) connected to one of the substrates;
- a light emitting diode (3) (light emitting device) mounted on the flexible wiring board (9) (flexible substrate) and the flexible substrate (9) is bent to a light receiving surface (7a) of the light guide (7).

Mitsuru does not expressly disclose that the light emitting device (LED) is mounted directly to the light receiving surface of the light guide.

However, Imaeda discloses (col.6, lines 8-16; Figs.1-5) that the LEDs (light emitting diodes 23) fixed to the left end of the light guide (22), i.e., the light emitting

device is mounted directly to the light receiving surface of the light guide, so that the light leakage is minimized and the light utilization is improved and the display brightness is improved. In order to use the light efficiently, the best method must be to mount the LED directly to the light receiving surface of the light guide, so that the light emitted from the LED would be efficiently coupled into the light guide so as to improve the light utilization while improve the display brightness.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to mount light emitting device directly to the light receiving surface of the light guide as claimed in claim 1 for improving the display brightness.

Claims 3-5, Mitsuru discloses (col.1, line 45 – col.3, line 47; Figs.1-2) that the flexible wiring board (9) (flexible substrate) has a terminals (2) connected to one of the LCD panel substrates, and the light emitting diode (3) is provided on the same surface of the flexible wiring board (9) as the surface where the terminal (2) is provided.

The wiring pattern can be provided either on the side opposite to the LED or on the side of the LED. Because the wiring can be arranged on the both sides of the flexible substrate and that was conventional.

The wiring pattern is provided on the side opposite to the LED, so that the wiring connection for the terminal wiring and the LCD panel must be through a through hole, and that would have been at least obvious for achieving the electrical connections being as short as possible. If the wiring pattern is provide on the side of the LED, the wiring connection for the terminal wiring and the LCD panel must avoid the light emitting

device such as LED, and that would have been at least obvious for achieving the electrical connections being as short as possible.

Claim 6, Mitsuru discloses (col.1, line 45 – col.3, line 47; Fig.1) that the light emitting surface (a) is at the side of the mounted surface of the light emitting device (3) to the flexible wiring board (9) (flexible substrate), and the light emitting surface (a) is mounted facing to the light receiving surface (7a) of the light guide (7). In order to use the light efficiently, the best method would be to mount the LED into the light receiving surface of the light guide, so that the light emitted from the LED would be efficiently coupled to the light guide so as to improve the light utilization while improve the display brightness, and that would have been at least obvious.

Claim 7, Mitsuru discloses (col.1, line 45 – col.3, line 47; Figs.5-6) a conventional liquid crystal display (as shown in Figs.5-6) in which the light guide (7) is formed in a bend shape so that the light receiving surface faces a direction opposite to the LCD panel substrates, and the light emitting surface of the light emitting diode (3) is mounted to the light receiving surface facing a direction opposite to the LCD panel substrates (see Fig.5b).

Mitsuru discloses in Figs. 5-6 that is a conventional structure, and Mitsuru discloses in Fig.1 that the light emitting diode can be mounted on the flexible wiring board (9). The light emitting device is mounted on the flexible substrate in different positions according to the different embodiments such as the light guide is formed opposite to a substrate or is formed in a bend shape that would have been an obvious

variations, because the light emitting device must be facing to the light receiving surface of the light guide.

Claim 8, Mitsuru discloses (col.1, line 45 – col.3, line 47; Figs.1-6) that the flexible wiring board (9) (flexible substrate) has a drive driver (4) (driving circuit for supplying signal) for driving the liquid crystal.

3. Claims 9-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-98415 (Mitsuru) in view of US 6,025,644 (Imaeda) and US 6,315,440 (Satoh).

Claims 9 and 20, Mitsuru discloses (col.1, line 45 – col.3, line 47; Figs.1-6) that a structure of liquid crystal display device comprising:

- a liquid crystal panel (10) (generally, the liquid crystal panel has a pair of substrates that holds the liquid crystal);
- a light guide (7) provided opposite to one of the substrates;
- a flexible wiring board (9) (flexible substrate) connected to one of the substrates;
- a light emitting diode (3) (light emitting device) mounted on the flexible substrate (9) and the flexible substrate (9) is bent along a light receiving surface (7a) of the light guide (7);
- the light emitting diode (3) is mounted on the flexible substrate (9).

Mitsuru does not expressly disclose that the light emitting device is mounted directly to the light receiving surface, and the positioning means (such as projection portion and recessed portion being engaged) are provided between the light emitting

device and the light receiving surface of the light guide for mounting the light emitting device to the light receiving surface of the light guide.

However, Imaeda discloses (col.6, lines 8-16; Figs.1-5) that the LEDs (light emitting diodes 23) fixed to the left end of the light guide (22), i.e., the light emitting device is mounted directly to the light receiving surface of the light guide, so that the light leakage is minimized and the light utilization is improved and the display brightness is improved. In order to use the light efficiently, the best method must be to mount the LED into the light receiving surface of the light guide, so that the light emitted from the LED would be efficiently coupled into the light guide so as to improve the light utilization while improve the display brightness.

Mitsuru and Imaeda do not expressly discloses that positioning means are provided, such as a projecting portion and a recessed portion being engaged.

However, Satoh discloses (col.4, line 28 – col.5, line 21; Figs.2-3) a liquid crystal display using flexible substrate (21), and two positioning through holes (26) provided on the forward end side of the flexible substrate (21) are respectively fitted to two positioning bosses (27) provided erectly on the back side of the holding member (22), so that the flexible substrate (21) is positioned. Although the positioning means is for positioning the flexible substrate (21) to the holding member (22), but that is the same principle for positioning the light emitting device such as LED to the light guide, and the two parts would be correspondently engaged together (the LEDs would be the positioning bosses and the recesses on the light receiving surface of the light guide would be the positioning through holes). To position two parts using positioning means

such as one part having projections and the other part having corresponding recesses so as to engage the two parts together (like a male part and a female part engaged together) was a conventional, and using such positioning means correspondently engage the LEDs with the light guide would increase the light utilization efficiency (minimizing the light lose).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to design a positioning means for mounting the light emitting device as claimed in claims 9 and 20 for achieving the correspondently mounting the light emitting device to the light receiving surface of the light guide so as to increase the light utilization efficiency, and improving the display brightness.

Claims 10-11, Satoh discloses (col.4, line 28 – col.5, line 21; Figs.2-3) using two positioning through holes (26) (recessed portion) and positioning bosses (27) (projecting portion) as the positioning means so as to engage the two parts in a liquid crystal display, and using projection on one part and using recess on the other part as the positioning means would have been at least obvious. The projecting portion using cylindrical pin or triangular prism or any other shape such as rounded top projection, etc., that would have been at least an obvious variations.

Claim 12, Mitsuru discloses (col.1, line 45 – col.3, line 47; Fig.1) that the flexible wiring board (9) (flexible substrate) is bend along the light receiving surface (7a) of the light guide (7) so that the light emitting device (3) is facing to the light receiving surface (7a).

Claims 13-15, Mitsuru discloses (col.1, line 45 – col.3, line 47; Figs.1-2) that the flexible wiring board (9) (flexible substrate) has a terminals (2) connected to one of the LCD panel substrates, and the light emitting diode (3) is provided on the same surface of the flexible wiring board (9) as the surface where the terminal (2) is provided. The wiring pattern can be provided either on the side opposite to the LED or on the side of the LED. Because the wiring can be arranged on the both sides of the flexible substrate and that would have been at least obvious. If the wiring pattern is provided on the side opposite to the LED, the wiring connection for the terminal wiring and the LCD panel must be through a through hole, and that would have been at least obvious. If the wiring pattern is provide on the side of the LED, the wiring connection for the terminal wiring and the LCD panel must avoid the light emitting device such as LED, and that would have been at least obvious.

Claim 16, Mitsuru discloses (col.1, line 45 – col.3, line 47; Fig.1) that the light emitting surface (a) is at the side of the mounted surface of the light emitting device (3) to the flexible wiring board (9) (flexible substrate), and the light emitting surface (a) is mounted facing to the light receiving surface (7a) of the light guide (7). According to the common knowledge, in order to use the light efficiently, the best method would be to mount the LED into the light receiving surface of the light guide, so that the light emitted from the LED would be efficiently coupled to the light guide so as to improve the light utilization while improve the display brightness, and that would have been at least obvious.

Claim 17, Mitsuru discloses (col.1, line 45 – col.3, line 47; Figs.5-6) a conventional liquid crystal display (as shown in Figs.5-6) in which the light guide (7) is formed in a bend shape so that the light receiving surface faces a direction opposite to the LCD panel substrates. Mitsuru discloses in Figs. 5-6 that is a conventional structure, and Mitsuru discloses in Fig.1 that the light emitting diode can be mounted on the flexible wiring board (9). The light emitting device is mounted on the flexible substrate in different positions according to the different embodiments such as the light guide is formed opposite to a substrate or is formed in a bend shape that would have been an obvious variations, because the light emitting device must be facing to the light receiving surface of the light guide, and when the light emitting device is mounted to the light receiving surface, and then the light leakage will be minimized, and that would have been at least obvious.

Claim 18, Mitsuru discloses (col.1, line 45 – col.3, line 47; Figs.1-6) that the flexible wiring board (9) (flexible substrate) has a drive driver (4) (driving circuit for supplying signal) for driving the liquid crystal.

Claim 19, concerning an electronic device using a liquid crystal device as claimed in claim 1 such as a flexible substrate connected to a control circuit to control the operation of the liquid crystal and a light emitting device is mounted to the light receiving surface of a light guide that would be only given weight as intended use. Because any display can be used for an electronic device, and that would have been at least obvious.

Response to Arguments

4. Applicant's arguments filed on June 11, 2003 have been fully considered but they are not persuasive.

Applicant's arguments are as follows:

1) The references do not disclose the light emitting device such as LED is mounted directly to the light receiving surface of the light guide.

Examiner's responses to Applicant's arguments are as follows:

1) The reference Mitsuru discloses (Fig.1) that the light emitting diode (3) is mounted on the flexible substrate (9) and facing to the light receiving surface (7a) of the light guide (7). According to the common knowledge, in order to use the light efficiently, the best method must be to mount the LED directly to the light receiving surface of the light guide, so that the light emitted from the LED would be efficiently coupled into the light guide so as to improve the light utilization while improve the display brightness. Such as the reference Imaeda discloses (col.6, lines 8-16; Figs.1-5) that the LEDs (light emitting diodes 23) fixed to the left end of the light guide (22), i.e., the light emitting device is mounted directly to the light receiving surface of the light guide, so that the light leakage is minimized and the light utilization is improved and the display brightness is improved.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Mike Qi
January 21, 2004

TOAN TON
PRIMARY EXAMINER